Urban Scale Modeling- Houston Case Study

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Overview

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  - Emissions
  - Ambient concentrations
- Results
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Background

- EPA recently conducted National Scale Air Toxics Assessment (NATA)
  - Modeled ambient concentrations, exposure & risk of 33 air toxic pollutants
  - Continental US modeling domain (+PR,VI)
  - Geographic resolution: census tract level
  - Shows contribution of:
    - major, area & other, onroad and nonroad sources; background
- Results on www.epa.gov/ttn/atw/nata

Urban Scale Study Objectives

- **Refined dispersion model analysis of urban area improving upon NATA assessment**
- **Provide improved modeling tools to better describe air quality on an urban scale**
- **Obtain a higher degree of resolution than national scale study**
- **Help identify data gaps**

History of Urban Study

- **"Conduct urban-scale assessments for a number of cities" is a component of the Integrated Urban Strategy (64FR137, July 99)**
- **Published: Dispersion Modeling of Toxic Pollutants in Urban Areas, Guidance, Methodology and Applications, EPA-454/R-99-021**
- **Published: A Simplified Approach for Estimating Secondary Production of Hazardous Air Pollutants Using the OZIPR Model, EPA-454/R-99-054**

Methods

- **Emission Inventory- 1996 NTI**
  - **point: correct source locations;get site specific locations for airports, landfills**
  - **non point: allocate county level emissions to 1 km grid cells**
  - **on road mobile: allocate emissions to actual road segments using local traffic counts, road locations and emission factors**
  - **non road mobile: allocate county level emissions to 1 km grid cells**

Methods (cont.)

- **Air Quality Model:**
  - **ISCST3: better area source representation; includes wet/dry deposition; added simple chemical transformation**
- **Model Performance Evaluation**
  - **Comparisons with seven ambient benzene monitors**

Results

- More detailed analysis provides more realistic patterns
- Better agreement with monitoring data
- Found large concentrations (hot spots) that were not detected in the national scale analysis
- Assessment still cannot be used to determine fence line concentrations

Conclusion

- **There are many air quality models applicable to urban areas**
- **We illustrated the use of the ISCST3 model**
- **We can estimate concentrations for many air toxic pollutants at a census tract resolution for input into exposure & risk models**
- **Taking more care in placing the emissions will improve results**